

REMARKS

Claims 1-20 are pending in this application and have been rejected. Claim 1 is an independent claim. Claims 2-20 are dependent claims.

Amendments to claims 1, 5-8, 12-15, 18, and 19 are presented herein. Claim 21 is newly added in this response. Formal replacement figures are submitted with this Response. No new matter is being presented, and approval and entry are respectfully requested.

The Objection to the Drawings

In the Office Action, at page 2, numbered paragraph 1, the drawings were objected to as being informal. Formal replacement figures have been submitted herewith. Therefore, the outstanding drawing objection should be resolved.

Reconsideration and withdrawal of the outstanding objection to the drawings are respectfully requested.

Rejections Under 35 U.S.C. § 102

In numbered paragraphs 3 and 4 on page 2 of the Office Action, the Examiner rejected claims 1-20 under 35 U.S.C. § 102(b) as being anticipated by Stoddard (U.S. Patent No. 2,745,095) or Parkinson et al. (U.S. Patent No. 3,126,172) or Glenn (U.S. Patent No. 4,174,818). Applicants respectfully traverse these rejections for the reasons presented below.

The Invention

The present invention relates to detecting reflected energy from targets and increasing the effective range of radar and ladar systems. The effective range of existing ground-based radar and ladar systems for detecting, tracking, and/or destroying targets, such as low flying aircraft and terrain-following cruise missiles, is limited by line of sight. The line of sight from a particular location may be defined by the curvature of the earth and terrain features such as valleys and mountains.

In an attempt to increase the effective range, existing radar and ladar systems have been remotely located on towers and in aerostats, airships, and aircraft. However, this requires that hundreds of pounds of electrical equipment requiring tens of kilowatts of power be located remote from the ground, which is very expensive and difficult for ground-based personnel to maintain.

Referring to Figure 1, in one embodiment of the present invention, radar or ladar hardware 32 located at ground level transmit a radar/ladar beam 26 upward to an elevated platform 22 that includes a reflector 41, which can be steered in a desired direction so that the radar/ladar beam 26 is further transmitted to the target 16 and returned (at 28) from the target 16. This permits ground-based radar operators to view over the horizon, increasing the effective range of the radar/ladar system, with a minimum amount of elevated hardware.

The References

Stoddard relates to missile guidance. Referring to Figure 3 of Stoddard, the flight of a projectile 50 is remotely controlled by a ground radio transmitter 10, which includes a reflector 12, and the projectile 50 is automatically guided into a target 16 within the radiation beam 17 by being guided towards the axis of the radar beam (Stoddard at col. 1, lines 18-24 and col. 4, lines 67-74).

Parkinson relates to a guidance system for the remote control of an airborne guided missile (Parkinson at col. 1, lines 11-15). Referring to Figure 1 of Parkinson, a ground-based (or sea-based) transmitter A, which includes a reflector 8, emits a beam E upon a target T. The missile M derives controlling intelligence from the beam E and uses it to remain within the beam E until the missile M approaches the target T. See Parkinson at col. 2, lines 32-43.

Glenn relates to guiding a missile onto a target using a laser beam by keeping the missile within the boresight of a laser beam (Glenn at abstract). Referring to Figure 1 of Glenn, a light transmitter 2 directs a light beam 3 at a target 4. The missile 6 determines its position within the beam 3 so that the missile 6 follows the boresight 5 of the beam 3 until the missile 6 contacts the target 4. See Glenn at col. 3, lines 12-28.

The Present Claimed Invention Distinguishes Over the Prior Art

Claim 1 of the present invention recites a reflected energy detecting device having at least one "elevated platform" supporting "a reflector remote from the transmitter and receiver" that "redirects the transmitted electromagnetic signal in a desired direction."

Referring to Figure 1 of the present invention, a transmitter/receiver 18 transmits an electromagnetic signal 26 to a remote reflector 41 on an elevated platform 22. The reflector 41 redirects the electromagnetic signal 26 towards a target 16. The electromagnetic signal 28 reflected from the target 16 is then received by the transmitter/receiver 18.

Unlike the cited references, the present invention relates to increasing the effective range of radar and ladar systems, not to missile guidance. As can be seen from Figure 3 of Stoddard, Figure 1 of Parkinson, and Figure 1 of Glenn, none of the cited references discloses an elevated platform having a remote reflector that redirects a transmitted electromagnetic signal in a desired direction. Thus, none of the cited references solves the line of sight problem of existing ground-based radar/ladar systems or extends the effective range of radar/ladar systems.

Therefore, it is submitted that claim 1 patentably distinguishes over the prior art.

As for the dependent claims, claims 2-20 depend from claim 1 and include all the limitations of claim 1 plus additional limitations that are not taught or suggested by the prior art. For example, claim 6 specifies that the remote reflector is movably supported by the elevated platform, which is neither taught nor suggested by the cited references. Therefore, for at least this reason and the reasons set forth above with respect to claim 1, it is submitted that claims 2-20 patentably distinguish over the prior art.

Therefore, Applicants submit that claims 1-20 patentably distinguish over the prior art. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejections under § 102.

New Claims

Claim 21 is newly added with this response to alternatively define the present invention. Claim 21 recites "a ground-based transmitter transmitting an electromagnetic signal; a ground-

based receiver; and an elevated platform comprising a reflector that redirects the transmitted electromagnetic signal in a desired direction, and redirects a reflected electromagnetic signal from a target to the ground-based receiver." These features are not taught or suggested by the cited references. Thus, for at least the reasons presented above, Applicants submit claim 21 patentably distinguishes over the prior art. Accordingly, Applicants respectfully request allowance of the new claim.

Conclusion

In accordance with the foregoing, it is respectfully submitted that all outstanding objections and rejections have been overcome and/or rendered moot, and further, that all pending claims patentably distinguish over the prior art. Thus, there being no further outstanding objections or rejections, the application is submitted to be in condition for allowance, which action is earnestly solicited.

If there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

Finally, if there are any additional fees associated with filing of this response, please charge the same to our Deposit Account No. 501121.

Respectfully submitted,

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IN THE DRAWINGS:

In the Office Action at item 1 of page 2, the Examiner objected to the drawings as being informal. To overcome this objection, formal replacement figures are submitted herewith. Approval of the Drawings is respectfully requested.